WHAT IS CLAIMED IS:

1. An in-band-flat-group-delay type dielectric filter, comprising:

a plurality of dielectric coaxial resonators;

a coupling circuit comprising a combination of reactive elements, with which the dielectric coaxial resonators are coupled to one another; and

input/output terminals connected to ends of the coupling circuit,

wherein the dielectric coaxial resonators include dielectric coaxial resonators coupled to the input/output terminals and inter-stage dielectric coaxial resonators, and a characteristic impedance of the dielectric coaxial resonators coupled to the input/output terminals is different from that of the inter-stage dielectric coaxial resonators.

2. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein both deviations in group delay time and in amplitude between the input/output terminals fall within predetermined certain deviation values, respectively, at the same time at a center frequency and within a specified frequency band around the center frequency, and a minimum value of a group delay time within a passband is at least one nanosecond.

3. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein the dielectric coaxial resonators coupled to the input/output terminals are half-wave dielectric resonators with their both ends opened.

4. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein the dielectric coaxial resonators coupled to the input/output terminals are quarter-wave dielectric resonators with their one ends short-circuited, and the inter-stage dielectric coaxial resonators are half-wave dielectric resonators with their both ends opened.

5. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein the characteristic impedance of the dielectric coaxial resonators coupled to the input/output terminals is made different from that of the inter-stage dielectric coaxial resonators by using dielectric materials with different dielectric constants.

6. The in-band-flat-group-delay type dielectric filter according to claim

1, wherein the characteristic impedance of the dielectric coaxial resonators coupled to the input/output terminals is made different from that of the inter-stage dielectric coaxial resonators by making diameter ratios of the dielectric coaxial resonators coupled to the input/output terminals and the inter-stage dielectric coaxial resonators to be different from each other.

7. The in-band-flat-group-delay type dielectric filter according to claim 1, further comprising a transmission line and a directional coupler,

wherein the coupling circuit is formed of capacitors, which are formed on a coupling board formed on a dielectric substrate, with which the dielectric coaxial resonators are coupled to one another, and an in-band-flat-group-delay type dielectric filter, which includes the coupling board and the dielectric coaxial resonators, and the directional coupler are combined via the transmission line to form one body.

8. The in-band-flat-group-delay type dielectric filter according to claim 7, wherein the coupling circuit is formed by forming the capacitors on a first dielectric substrate, the directional coupler is formed on a second dielectric substrate, and the first dielectric substrate and the second dielectric substrate are combined to form one body.

9. The in-band-flat-group-delay type dielectric filter according to claim 1, further comprising metallic screw tuners positioned adjacent to and in parallel to open ends of the dielectric coaxial resonators,

wherein resonance frequencies of the dielectric coaxial resonators can be regulated by varying distances between the screw tuners and the dielectric coaxial resonators.

10. The in-band-flat-group-delay type dielectric filter according to claim 1, further comprising:

metal fittings for frequency regulation electrically connected to internal conductors of the dielectric coaxial resonators; and

metallic screw tuners positioned adjacent to and in parallel to the metal fittings for frequency regulation,

wherein resonance frequencies of the dielectric coaxial resonators can be regulated by varying distances between the metal fittings for frequency regulation and the screw tuners.

11. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein metallic screw tuners provided movably in a direction perpendicular to open ends of the dielectric coaxial resonators are inserted into inner holes of the dielectric coaxial resonators via dielectrics or insulators, and by varying lengths of portions of the metallic screw tuners inserted into the inner holes resonance frequencies of the dielectric coaxial resonators can be regulated.

12. The in-band-flat-group-delay type dielectric filter according to any one of claims 9 to 11,

wherein the screw tuners are attached to a case with one ends of the screw tuners being exposed to the outside of the case, and resonance frequencies can be regulated by regulating positions of the screw tuners from the outside of the case.

13. An in-band-flat-group-delay type dielectric filter, comprising:

a plurality of filter blocks, each of which is formed of an in-band-flat-group-delay type dielectric filter according to claim 1; and

a transmission line,

wherein the plurality of filter blocks are cascaded with the transmission line having a characteristic impedance whose value is substantially the same as that of an input/output impedance.

14. The in-band-flat-group-delay type dielectric filter according to claim 13, wherein the plurality of filter blocks are separated by shielding cases individually.

15. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein a uniform-group-delay frequency band is within a passband in amplitude transfer characteristics and a variation in amplitude in the amplitude transfer characteristics within the uniform-group-delay frequency band is smaller than that in amplitude in the whole passband in the amplitude transfer characteristics outside the uniform-group-delay frequency band.

16. The in-band-flat-group-delay type dielectric filter according to claim 15, wherein a minimum value of insertion loss within the passband in

the amplitude transfer characteristics falls within the uniform-group-delay frequency band.

17. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein a uniform-group-delay frequency band is within a passband in amplitude transfer characteristics and a center frequency of the uniform-group-delay frequency band is higher than that of the passband in the amplitude transfer characteristics.

18. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein a uniform-group-delay frequency band is within a passband in amplitude transfer characteristics and the passband in the amplitude transfer characteristics has a width at least twice as wide as that of the uniform-group-delay frequency band.

19. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein frequency characteristics in group delay time have peak values at both edges of a passband in amplitude transfer characteristics and one of the peak values on a lower edge side of the passband in the amplitude transfer characteristics is larger than the other of the peak values on an upper edge side.

20. The in-band-flat-group-delay type dielectric filter according to claim 1, wherein a return loss within a uniform-group-delay frequency band has a ripple, and a minimum value of the ripple within the uniform-group-delay frequency band is larger than that of a ripple in a return loss outside the uniform-group-delay frequency band and decreases from a center portion toward both edges of a passband in amplitude transfer characteristics.

21. A dielectric filter, comprising:

a plurality of dielectric coaxial resonators;

a coupling circuit comprising a combination of reactive elements, with which the dielectric coaxial resonators are coupled to one another; and

input/output terminals connected to ends of the coupling circuit,

wherein both deviations in group delay time and in amplitude between the input/output terminals fall within specified certain deviation values, respectively, at the same time at a center frequency and within a

specified passband around the center frequency, and by using a variable reactive element as at least one reactive element included in the coupling circuit, a group delay time within the passband can be varied.

22. A dielectric filter, comprising a plurality of dielectric coaxial resonators,

wherein each adjacent two of the dielectric coaxial resonators are coupled to each other via at least two reactive elements connected in series, a portion between the at least two reactive elements and a ground are connected via a variable reactive element, and a value of the variable reactive element is varied to allow a group delay time within a passband to be varied.

23. . An in-band-flat-group-delay type dielectric filter, comprising:

a plurality of dielectric resonators,

a main circuit formed of series coupling capacitors, with which the dielectric resonators are coupled to one another; and

an auxiliary circuit for coupling the main circuit to capacitors by bypass coupling,

wherein both deviations in group delay time and in amplitude between input/output terminals fall within specified certain deviation values, respectively, at the same time at a center frequency and within a specified frequency band around the center frequency.

24. The in-band-flat-group-delay type dielectric filter according to claim 23, wherein the auxiliary circuit includes parallel bypass capacitors and series bypass capacitors;

two of the series coupling capacitors connect between the adjacent dielectric resonators;

each one end of the parallel bypass capacitors is connected to a junction between the two of the series coupling capacitors; and

the other ends of the adjacent parallel bypass capacitors are connected to be short circuited or via at least one of the series bypass capacitors.

25. The in-band-flat-group-delay type dielectric filter according to claim 23, wherein th auxiliary circuit includes parallel bypass capacitors and

series bypass capacitors;

one of the series coupling capacitors connects between the adjacent dielectric resonators;

each one end of the parallel bypass capacitors is connected to a junction between the series coupling capacitors; and

the other ends of the adjacent parallel bypass capacitors are connected to be short circuited or via at least one of the series bypass capacitors.

26. The in-band-flat-group-delay type dielectric filter according to claim 24 or 25, wherein at least one of the parallel bypass capacitors is opened.

27. The in-band-flat-group-delay type dielectric filter according to claim 24 or 25, wherein at least one of the series bypass capacitors is short circuited.

28. The in-band-flat-group-delay type dielectric filter according to any one of claims 23 to 25, wherein frequency characteristics in group delay have a peak value at a lower edge of a passband in amplitude transfer characteristics and uniform-group-delay frequency characteristics within the passband; and in a higher frequency band than an upper edge of the passband, the frequency characteristics in group delay frequency characteristics do not increase from a uniform group delay time within the passband but decrease.

29. A linearized amplifier, including a dielectric filter according to any one of claims 1, 15, and 18 to 25, wherein a group delay time in a distortion compensating circuit is regulated by the dielectric filter.

30. The linearized amplifier according to claim 29, wherein the distortion compensating circuit is a feedforward-type distortion compensating circuit.

31. The linearized amplifier according to claim 29, wherein a uniform-group-delay frequency band width in the dielectric filter is at least three times as wide as a bandwidth required for the linearized amplifier.

32. A linearized amplifier, including a dielectric filter according to claim 26, wherein a group delay time in a distortion compensating circuit is regulated by the dielectric filter.

33. The linearized amplifier according to claim 32, wherein the distortion compensating circuit is a feedforward-type distortion compensating circuit.

34. The linearized amplifier according to claim 32, wherein a uniform-group-delay frequency band width in the in-band-flat-group-delay type dielectric filter is at least three times as wide as a bandwidth required for the linearized amplifier.

35. A linearized amplifier, including a dielectric filter according to claim 27, wherein a group delay time in a distortion compensating circuit is regulated by the dielectric filter.

36. The linearized amplifier according to claim 35, wherein the distortion compensating circuit is a feedforward-type distortion compensating circuit.

37. The linearized amplifier according to claim 35, wherein a uniform-group-delay frequency band width in the in-band-flat-group-delay type dielectric filter is at least three times as wide as a bandwidth required for the linearized amplifier.

38. A linearized amplifier, including a dielectric filter according to claim 28, wherein a group delay time in a distortion compensating circuit is regulated by the dielectric filter.

39. The linearized amplifier according to claim 38, wherein the distortion compensating circuit is a feedforward-type distortion compensating circuit.

40. The linearized amplifier according to claim 38, wherein a uniform-group-delay frequency band width in the in-band-flat-group-delay type dielectric filter is at least three times as wide as a bandwidth required for the

linearized amplifier.